IN THE CLAIMS

Presented below are all the claims, including those amended.

Please cancel claims 1-10, 21, 33, 49, and 52 without prejudice.

1. (canceled)

2. (canceled)

3. (canceled)

4. (canceled)

5. (canceled)

6. (canceled)

7. (canceled)

8. (canceled)

9. (canceled)

10. (canceled)

11. (currently amended) An output packet organizer, comprising:

~~a) first location to store at least one high priority packet identifier, said high priority packet identifier indicating where a high priority packet is waiting within a packet buffer;~~

a) ~~b)~~ n time slot locations wherein n is an integer, each of said n time slot locations to store one or more of its own ~~low priority~~ packet identifiers, each of said ~~low priority~~ packet identifiers having a corresponding packet, each of said packet identifiers indicating where ~~a~~ its corresponding ~~low priority~~ packet is waiting within ~~said~~ a packet buffer~~, said high priority packet having a higher priority than each of said low priority packets~~; and,

b) ~~c)~~ a scheduler to service said n time slot locations according to a plurality of scheduling cycles, ~~wherein said first location and~~ one of said n time slot locations ~~is~~ to be serviced for each of said scheduling cycles ~~so as to cause, in n scheduling cycles, said first location being serviced n times and said n time slot locations each being serviced one time~~, whichever of said n time slot locations to be serviced during a particular scheduling cycle determined by a round robin pointer, said round robin pointer having a temporal rotation period so as to cause said n time slot locations to correspond to n different queuing delays, ~~said~~ a servicing of a said time slot location causing removal of ~~a~~ said time slot location's one or more packet identifier~~s stored therein~~, said removal ~~of a said packet identifier stored therein~~ causing sending of a packet ~~identified by said packet identifier~~ from said packet buffer for each of said time slot location's one or more packet identifiers that are said removed~~, wherein each of said scheduling~~

~~cycles corresponds to an output rate defined by an amount of packet data sent from said packet buffer per unit of time~~.

12. (currently amended) The output packet organizer of claim 11 wherein ~~said scheduler is to service said n time slot locations in a round robin fashion~~ said temporal rotation period is configurable so as to allow said n different queuing delays to be configurable.

13. (currently amended) The output packet organizer of claim 11 ~~wherein said high priority packet is a packet that carries real time traffic~~ further comprising a high priority location to store a high priority packet identifier that indicates where a high priority packet is waiting within said packet buffer, said high priority location coupled to said scheduler.

14. (currently amended) The output packet organizer of claim 13 ~~wherein said real time traffic further comprises voice traffic~~ further comprising a highest priority location to store highest priority packet identifiers that indicate where a highest priority packet is within said packet buffer, said highest priority location coupled to said scheduler, said highest priority packet having higher priority than said high priority packet.

15. (currently amended) The output packet organizer of claim ~~11 wherein at least one of said n low priority packets is a packet that carries data traffic~~ 14 wherein said highest

priority packet is a network maintenance packet and said high priority packet is a real time packet.

16. (currently amended) The output packet organizer of claim 15 wherein said ~~data traffic further comprises an e-mail message~~ n time slot locations store packet identifiers that identify packets are neither network maintenance packets nor real time packets..

17. (currently amended) The output packet organizer of claim 16 ~~11 further comprising a second location to store a higher priority packet identifier, said higher priority packet identifier indicating where a higher priority packet, that is waiting to be sent from said packet buffer, is located within said packet buffer, said higher priority packet having a higher priority than said high priority packet, and wherein said second location can be serviced by said scheduler for each of said scheduling cycles~~ wherein packets identified by packet identifiers that are stored within but not released from a pointed to time slot location are sent from said packet buffer prior to any packets identified by packet identifiers that are stored with the time slot location that, according to said round robin pointer, is to be next serviced after said pointed to time slot location.

18. (currently amended) ~~The output packet organizer of claim 17 wherein said higher priority packet carries network maintenance traffic~~ The apparatus of claim 11 wherein packets identified by packet identifiers that are stored within but not released from a pointed to time slot location are sent from said packet buffer prior to any packets

identified by packet identifiers that are stored with the time slot location that, according to said round robin pointer, is to be next serviced after said pointed to time slot location.

19. (currently amended) The output packet organizer of claim 11 wherein said scheduler services a pointed to time slot ~~said~~ location only if said pointed to time slot location is storing a said packet identifier.

20. (currently amended) The output packet organizer of claim 19 further comprising a second location to store a lower priority packet identifier, said lower priority packet identifier indicating where a lower priority packet, that is waiting to be sent from said packet buffer, is located within said packet buffer, said lower priority packet having a lower priority than ~~said n low priority~~ packets identified by packet identifiers stored within said n time slot locations, and wherein said second location can be serviced by said scheduler only if a ~~said location other than said second~~ pointed to time slot location or higher priority location than said pointed to time slot location is empty when said scheduler looks to service said ~~other~~ pointed to time slot location or higher priority location than said pointed to time slot location.

21. (canceled)

22. (currently amended) The output packet organizer of claim ~~21~~ 11 wherein said scheduler is capable of servicing ~~low priority~~ packet identifiers from one of said n time slot locations, per said scheduling cycle, such that a ~~second~~ percentage of ~~said~~ an

amount of packet data removable from said packet buffer as authorized by said scheduler per scheduling cycle can be removed from said packet buffer, in the form of ~~low priority~~ packets identified by packet identifiers stored a time slot location, per said scheduling cycle.

23. (currently amended) The output packet organizer of claim 22 wherein said scheduler is capable of servicing high priority packet identifiers from ~~said first~~ a high priority location during said scheduling cycle, to the extent they represent an amount of high priority packet data greater than ~~said first~~ a second percentage of said amount of packet data, at the expense of ~~low priority~~ packet identifiers stored within the time slot location ~~scheduled~~ pointed to by said round robin pointer to be serviced for said scheduling cycle.

24. (currently amended) The output packet organizer of claim 23 wherein ~~a next time slot location is capable of accepting said low priority~~ packet identifiers that were left un-serviced as a result of said servicing of said high priority packet identifiers that represented high priority packet data beyond said ~~first~~ second percentage~~, and where said next time slot location~~ will be serviced by said scheduler during a next scheduling cycle that follows said scheduling cycle.

25. (currently amended) The output packet organizer of claim 11 wherein a weighted fair queue is capable of being built into said n elastic time slots by establishing a first quantitative flow having a higher output rate than a second quantitative flow~~, such that,~~

~~low priority packets assigned to said first quantitative flow endure less waiting time within said packet buffer than low priority packets assigned to said second quantitative flow~~.

26. (currently amended) The output packet organizer of claim 11 wherein a first plurality of different users are capable of being assigned to said first quantitative flow and a second plurality of different users are capable of being assigned to said second quantitative flow.

27. (currently amended) A method, comprising:

servicing ~~a first location and~~ n time slot locations according to a plurality of scheduling cycles~~, wherein said first location and one of said n time slot locations are serviced for each of said scheduling cycles so as to cause, in n scheduling cycles, said first location being serviced n times and said n time slot locations each being serviced one time~~, whichever of said n time slot locations to be serviced during a particular scheduling cycle determined by a round robin pointer, said round robin pointer having a temporal rotation period so as to cause said n time slot locations to correspond to n different queuing delays, said servicing of ~~any of~~ said n time slot locations causing removal of at least one packet identifier stored therein, said removal ~~of a packet identifier stored therein~~ causing sending of a packet identified by said packet identifier from a packet buffer~~, wherein each of said scheduling cycles corresponds to an output rate defined by an amount of packet data sent from said packet buffer per unit of time,~~

~~said first location used to store packet identifiers of a first priority, said n time slot locations used to store packet identifiers of a second priority, said first priority higher than said second priority~~.

28. (currently amended) The method of claim 27 wherein said ~~n time slot locations are serviced in a round robin fashion~~round robin pointer has a configurable rotation time so as to cause each of said queuing delays to be configurable.

29. (currently amended) The method of claim 27 ~~wherein at least one of said first priority packet identifiers identifies where a packet that carries real time traffic is found within said buffer memory~~ further comprising, for each scheduling cycle of said plurality of scheduling cycles, servicing a high priority packet identifier from a high priority location, said high priority packet having higher priority than any packet stored within said n time slot locations.

30. (currently amended) The method of claim 29 wherein each of said high priority packet identifiers identify a packet that carries ~~said~~ real time traffic ~~further comprises voice traffic~~.

31. (currently amended) The method of claim ~~27~~ 30 wherein ~~at least of said second priority packet identifiers identifies where~~ those packet identifiers that are stored within said n time slot locations each identify a packet that carries data traffic ~~is found within said buffer memory~~.

32. (currently amended) The method of claim 31 ~~wherein said data traffic further comprises an e-mail message~~ further comprising, for each scheduling cycle of said plurality of scheduling cycles, servicing a higher priority packet identifier from a higher priority location, said higher priority packet higher in priority than said high priority packet.

33. (canceled)

34. (currently amended) The method of claim ~~33~~ 32 wherein said higher priority packet carries network maintenance traffic.

35. (currently amended) The method of claim 27 ~~wherein said locations are serviced only if a said location is storing a said packet identifier~~ further comprising said scheduler allowing a best effort location to release one or more packet identifiers during a scheduling cycle as a consequence of said scheduling cycle's pointed to time slot location having only stored packet identifiers that correspond to less than an amount of packet data per scheduling cycle that may be released from a pointed to time slot location per scheduling cycle.

36. (currently amended) The method of claim 35 ~~27 further comprising servicing a second location according to said plurality of scheduling cycles, said second location used to store a lower priority packet identifier than said second priority packet identifier,~~

~~said lower priority packet identifier indicating where a packet, whose priority is lower than a packet identified by a said second priority packet identifier, is waiting within said packet buffer to be sent from said packet buffer, and said second location is said serviced only if a said location other than said second location is empty when its turn to be serviced arises during a said scheduling cycle~~ wherein said best effort location stores a packet identifier whose corresponding packet represents traffic in excess of an allocated rate.

37. (currently amended) The method of claim 27 wherein each of said scheduling cycles corresponds to an output rate defined by an amount of packet data sent from said packet buffer per unit of time and wherein one or more ~~of said first~~ high priority packet identifiers are configured to be serviced from ~~said first~~ a high priority location, per ~~a said~~ scheduling cycle, such that a first percentage of said amount of packet data is removed from said packet buffer~~,~~ in the form of ~~first~~ high priority packets~~,~~ per ~~said~~ scheduling cycle, where, said high priority packets are higher in priority than those packets identified by packet identifiers stored in said time slot locations.

38. (currently amended) The method of claim 37 wherein ~~said second priority~~ packet identifiers ~~are~~ allowed to be serviced per scheduling cycle from ~~one of said n~~ a time slot location~~s, per said scheduling cycle, such that~~ correspond to a second percentage of said amount of packet data ~~is removed from said packet buffer, in the form of second priority packets, per said scheduling cycle~~.

39. (currently amended) The method of claim 38 ~~wherein~~ further comprising servicing during a scheduling cycle high ~~first~~ priority packet identifiers ~~are serviced~~ from said ~~first~~ high priority location, and, to the extent they represent an amount of ~~first~~ high priority packet data greater than said first percentage, servicing said high priority packet identifiers at the expense of ~~second priority~~ packet identifiers stored within the time slot location ~~scheduled to be serviced~~ pointed to for said scheduling cycle.

40. (currently amended) The method of claim 39 wherein ~~a next time slot location accepts said second priority~~ packet identifiers that were left un-serviced after expiration of a scheduling cycle in which the time slot location they are stored in was pointed to ~~as a result of said servicing of said first priority packet identifiers that represented first priority packet data beyond said first percentage, said next time slot location serviced during a next scheduling cycle that follows said scheduling cycle~~are serviced during a next scheduling cycle relative to said scheduling cycle and before any of those packet identifiers stored in a next pointed to location relative to said pointed to location.

41. (currently amended) The method of claim 27 wherein a weighted fair queue is built into said n time slots by establishing a first quantitative flow having a higher output rate than a second quantitative flow~~, such that, second priority packets assigned to said first quantitative flow endure less waiting time within said packet buffer than second priority packets assigned to said second quantitative flow~~.

42. (previously presented) The output packet organizer of claim 41 wherein a first plurality of different users are assigned to said first quantitative flow and a second plurality of different users are assigned to said second quantitative flow.

43. (currently amended) An apparatus, comprising:

a) a packet buffer capable of storing packets ~~:~~

~~1) packets of a first priority;~~

~~2) packets of a lower priority than said first priority, said lower priority packets suited to withstanding longer wait times in said packet buffer than said first priority packets~~; and,

b) an output packet organizer coupled to said packet buffer, said output packet organizer to organize and release packet identifiers that point to said packets, where, a said release of a packet identifier from said output packet organizer triggers said packet identifier's corresponding packet to be sent from said packet buffer toward an outbound networking line, said output packet organizer comprising:

1) ~~a first location to store first priority packet identifiers that each point to a different one of said first priority packets, said first location coupled to a scheduler so as to be capable of releasing a first priority packet identifier for each of n scheduling cycles;~~

~~2)~~ n ~~or more~~ time slot locations to store packet identifiers that point to said ~~lower priority~~ packets, and, a round robin pointer ~~that~~ to points to a ~~next~~ time slot locations ~~for each of said n scheduling cycles so as to be capable~~

~~of releasing a low priority packet identifier from a different one of said n time slot locations for each of said n scheduling cycles~~ to be serviced during a particular scheduling cycle, said round robin pointer having a temporal rotation period so as to cause said n time slot locations to correspond to n different queuing delays, and,

2) a scheduler to pace a plurality of scheduling cycles, said scheduling cycle being one of said scheduling cycles.

44. (currently amended) The apparatus of claim 43 wherein said packet buffer is also capable of storing higher priority packets having a priority higher than said ~~first priority~~packets.

45. (currently amended) The apparatus of claim 44 wherein said packets that are higher priority than said ~~first priority~~ packets at least comprise ~~are~~ network maintenance/control packets.

46. (currently amended) The apparatus of claim ~~43~~ 44 wherein said output packet organizer further comprises ~~a second~~ at least one location to store ~~higher than first priority~~ said packet identifiers that each point to a different one of said higher ~~than first~~ priority packets, said ~~second~~ at least one location coupled to said scheduler so as to be capable of releasing ~~a~~ one or more of said higher ~~than first~~ priority packet identifiers for each of ~~n~~ said plurality of scheduling cycles.

47. (currently amended) The apparatus of claim ~~43~~ 46 wherein said first priority packets are real time packets and network maintenance/control packets.

48. (currently amended) The apparatus of claim ~~43~~ 47 wherein said ~~lower priority~~ packets identified by packet identifiers stored within said n time slot locations are neither real time packets nor network maintenance/control packets.

49. (canceled)

50. (currently amended) The apparatus of claim 49 wherein said scheduling cycles are organized into an amount of packet data sent from said packet buffer per unit of time, and where said ~~group of n or more~~ plurality of time slot locations and said pointer are capable of effectively causing a ~~second~~ percentage worth of said amount of packet data of said ~~low priority~~ packets to be sent from said packet buffer for each scheduling cycle of said ~~n~~ plurality of scheduling cycles.

51. (currently amended) The apparatus of claim 50 wherein~~, low priority~~ one or more of said packet identifiers whose time slot location~~s are~~ is pointed to during said particular scheduling cycle but are not released ~~if and to the extent packet identifiers having higher priority than said low priority packet identifiers exceed their allotted percentage~~ as a consequence are nevertheless released before packet identifiers whose time slot location is next pointed to.

52. (canceled)

53. (currently amended) The apparatus of claim 52 wherein said pointer is a round robin pointer having a configurable rotation time, said plurality of time slot locations being a plurality of elastic time slots as a consequence of said configurable rotation time.

54. (currently amended) The apparatus of claim 43 wherein a weighted fair queue is capable of being built into said time slot locations by establishing a first quantitative flow having a higher output rate than a second quantitative flow~~, such that, low priority packets assigned to said first quantitative flow endure less waiting time within said packet buffer than low priority packets assigned to said second quantitative flow~~.

55. (previously presented) The output packet organizer of claim 54 wherein a first plurality of different users are capable of being assigned to said first quantitative flow and a second plurality of different users are capable of being assigned to said second quantitative flow.

56. (currently amended) The apparatus of claim 43 wherein said output packet organizer is coupled to a pipeline stage of a packet processing pipeline, said pipeline stage to at least store each of said ~~low priority~~ packet identifiers into a said time slot location that corresponds to an appropriate queuing delay for its corresponding low priority packet, each of said appropriate queuing delays calculated within said pipeline,

where, said pipeline stage is to recognize which time slot location corresponds to ~~said~~ an appropriate delay based upon a data structure ~~that reflects the state of said output packet organizer and~~ that is passed from said output packet organizer to said pipeline stage for each of said low priority packets.

57. (previously presented) The apparatus of claim 56 wherein said pipeline further comprises the following pipeline stages for regulating traffic offered by a network to a first user of said network and a second user of said network, wherein, the following pipeline stages precede said pipeline stage in said pipeline:

a) a first pipeline stage comprising:

1) a first data bus to receive from a first memory:

(i) during a first pipeline cycle:

a first output flow identifier;

(ii) during a second pipeline cycle:

a second output flow identifier; and

b) a second pipeline stage that follows said first pipeline stage, said second pipeline stage comprising:

1) a second data bus to receive from a second memory:

(i) during said second pipeline cycle and from a location of said second memory pointed to by said first output flow identifier:

a first TOS parameter for a first of said low priority packets, said first low priority output packet destined for said first user;

(ii) during a third pipeline cycle and from a location of said second memory pointed to by said second output flow identifier:

a second TOS parameter for a second of said low priority packets, said second low priority packet destined for said second user;

2) register space in which to store:

(iii) during said second pipeline cycle:

a first parameter from which a first of said delays can be calculated, said first delay for a first of said low priority packets, said first delay consistent with said first output flow;

(iv) during said third pipeline cycle:

a second parameter from which a second of said delays can be calculated, said second delay for a second of said low priority packets, said second delay consistent with said first output flow;

3) logic circuitry to calculate:

(v) during said second pipeline cycle:

said first delay;

(vi) during said third pipeline cycle;

said second delay.

REMARKS

Reconsideration of this application as amended is respectfully requested.

The present amendment is a supplement to the amendment filed July 3, 2003, which was in response to the Office Action mailed March 18, 2003.

By way of the present supplemental amendment, applicants have canceled claims 1-10, 21, 33, 49 and 52; and have amended claims 11-20, 22-32, 34-41, 43-48, 50, 51, 53, 54, and 56. It is respectfully submitted that no new matter has been added.

Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Independent claims 11, 27, and 43 each refer to a round robin pointer having a temporal rotation period so as to cause n time slot locations to correspond to n different queuing delays. Applicants respectfully submit that the prior art cited by the Examiner fails to disclose, teach, or suggest alone or in combination the subject matter being claimed by amended independent claims 11, 27 and 43.

Given that (1) claims 12-20 and 22-26 depend directly or indirectly from claim 11; (2) claims 28-32 and 34-42 depend directly or indirectly from claim 27; and (3) claims 44-48, 50-51, and 53-57 depend directly or indirectly from claim 43, applicants submit that those dependent claims 12-20, 22-26, 28-32, 34-42, 44-48, 50-51, and 53-57 are likewise patentable over the prior art cited by the Examiner.

Applicants therefore respectfully submit that the rejections and objection have been overcome.

If there are any additional charges not covered by any check submitted, please charge Deposit Account No. 02-2666.

Respectfully submitted,

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